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Large Hadron Collider
Magnet Division Procedure

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Class: Ancillary Specification
Title: Receiving/Inspection of SSC Wire for 30-Strand Cable

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REVISION RECORD

Rev. No.	Date	Page	Subject	Approval
A	8/24/99		Initial Release.	

1. Scope:

This procedure establishes the incoming inspection requirements for SSC 0.0255 inch superconducting wire. It is intended for the vendor who has been assigned the responsibility of receiving and inspecting surplus SSC outer wire for use in making 30-strand cable for BNL to be used in RF and Insertion dipole magnets for LHC.

2. Applicable Documents:

Test Method 4141-1 Wire Sharp Bend Test

Inventory list from BNL

3. Requirements:

3.1 All superconducting wire spools delivered to the cabling vendor shall be inspected in accordance with the requirements of this procedure and the terms stated in the purchase order.
3.2 All measurements and observations shall be recorded on a data sheet, a summary of which is to be delivered to BNL in electronic form.
3.3 All spools that do not meet the requirements of this inspection procedure shall be clearly identified as non-conforming, and segregated to preclude their use.

4. Procedure:

4.1 Spool Identification, Segregation , Sampling, and Testing

4.1.1 Inspect the shipping crate for any obvious damage that may have occurred during shipping. Record the evidence of any such damage.
4.1.2 Visually inspect each spool for evidence of damage, contamination from foreign object debris, or any other condition which may cause doubt about the integrity of the wire, or its ability to be cabled in a conforming manner.
4.1.3 For each spool of wire in the crate, check whether the exterior packaging and either flanges of the spool contain the following information:

Cable Spool No. _____
Length _____feet
Weight _____ lbs.
Date of Manufacture _____
Name of Manufacturer _____

Record the information on a master list to be cross-referenced with the list provided by BNL.

If the Cable Spool No. and/or the name of the manufacturer is missing then the spool is to be rejected and segregated from the rest.

4.1.4 From the list supplied from BNL, reject and segregate all spools that have wire lengths less than 2150 ft. (656 meters). These are to be clearly identified as " Non-Conforming Material based on length".

4.1.5 Measure and record the weight of each spool that meets the minimum length requirement (>2150ft). From this weight, subtract the weight of a similar empty spool to obtain the weight of the wire.

4.1.6 Using the known weight of a unit length of wire, calculate and record the estimated length of wire on each spool to the nearest foot. Verify that this calculated length is approximately equal to the length recorded on the BNL supplied list. Reject and segregate all spools that have wire lengths less than 2175 ft (663 meters).

4.1.7 From each acceptable spool, remove 10 feet of wire from the lead end and package it in BNL supplied sample envelope. Record all wire information on the label provided and affix to the envelope. These samples are to be shipped to BNL.

4.1.8 Remove 1 ft. of wire from each acceptable spool and perform the Sharp Bend Test using Test Method 4141-1. Record Pass/Fail for each sample tested.

Test Method 4141-1 - Wire Sharp Bend Test

1. Purpose:

   The purpose of this test is to approximately simulate the deformation to the superconductor wire that may occur during cabling. The sharp bend fixture is made to produce 20% deformation for the wire diameter used.

2. Materials Required:

   A 3-inch long sample of wire to be tested

3. Test Equipment:

   Wire Sharp Bend Test Fixture or equivalent.

4. Applicable Documents:

   None

5. Test Procedure:

5.1 Bend the wire sample in half and place the bend in the slot of the fixture.

5.2 Slide the mating top of the fixture in the slot and squeeze the sample halves together with a bench vise until closed.

5.3 Remove the top of the fixture and loosen the side screw.

5.4 The sample now resembles a hairpin. Examine the bend under 10x magnification to determine if the wire is cracked or deformed. Any indication of cracking or unusual deformation is cause for rejection and must be brought to the attention of BNL.

5.5 Etch the sharp bend sample while stress-free in nitric acid. Use all precautions in handling acids. Examine the sample again with 10x magnification to determine possible filament damage. Any indication of filament damage is cause for rejection and must be brought to the attention of BNL.